

REMARKS

Through this Reply, Applicants have amended Claims 25, 28, and 31. Accordingly, Claims 25-33 are active in the present application.

The Examiner has rejected Claims 31-33 under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time of the invention, had possession of the claimed invention. Specifically, the Examiner asserts that there is no support for a modified SOG film formed by implanting boron impurity into an inorganic SOG film. Applicants respectfully traverse the rejection. Specifically, Applicants note that support for the claim may be found in the specification on at least page 17, lines 17-21, where the specification states that “each of the organic SOG films 6 and 13 may be replaced with an inorganic SOG film, and the inorganic SOG film may be subjected to ion implantation. In this case, the water and hydroxyl groups contained in the inorganic SOG film can be reduced.” Furthermore, at page 17, lines 25-26, the specification states that any ion may be implanted into films 6 and 13, and also specifically lists boron as such an ion. Accordingly, Applicants submit that Claims 31-33 are allowable.

The Examiner has rejected Claims 25-33 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,984,055 to Okumura et al. (hereinafter “Okumura”). Applicants have amended claims 25 and 31 to more particularly point out the claimed invention. The present invention, as claimed by independent claim 25, is directed to a semiconductor device having “a semiconductor substrate; an interlayer insulating film located on the semiconductor substrate; wirings located on the interlayer insulating film; and a passivation film covering the surface of the interlayer insulating

film and the wirings” (emphasis added). The passivation film includes a first insulating film that is a modified spin-on-glass (SOG) film containing boron impurity implanted into an organic SOG film.

Applicants submit that Okumura does not disclose each and every element of the claimed invention. Okumura merely discloses an interlayer insulating film (12, 13, 14) comprising a SOG layer (13) and oxide layers (12, 14) above and beneath the SOG layer (13). Okumura then states that a wiring layer (16, 17) is deposited on the interlayer insulating film. Okumura discloses a polysilicon layer (16) and a refractory metal silicide layer (17) as a wiring layer located on the SOG layer (13), and do not disclose a passivation film located on the silicide layer (17). The Examiner references the interlayer insulating film disclosed in Okumura as corresponding to both the interlayer insulating film, and the passivation film. Accordingly, for at least this reason, Applicants submit that Claim 25 is patentably distinguishable from Okumura. Furthermore, Applicants submit that claims 26-30, which depend (directly or indirectly) from claim 25, are likewise patentably distinguishable for at least the same reason.

With respect to independent Claim 31, the present invention is directed to a semiconductor device having “a semiconductor substrate; an interlayer insulating film located on the semiconductor substrate; wirings located on the interlayer insulating film; and a passivation film covering the surface of the interlayer insulating film and the wirings” (emphasis added). The passivation film includes a first insulating film that is a modified spin-on-glass (SOG) film containing boron impurity implanted into an inorganic SOG film.

For similar reasons as described with respect to Claim 25, Applicants submit that Okumura does not disclose each and every element of the claimed invention. In particular, Okumura discloses a polysilicon layer (16) and a refractory metal silicide layer (17) as a wiring layer located on the SOG

layer (13), and does not disclose a passivation film that is a modified SOG film covering a wiring layer and an interlayer insulating film, as required by Claim 31. The Examiner references the interlayer insulating film disclosed in Okumura as corresponding to both the interlayer insulating film, and the passivation film. Accordingly, for at least this reason, Applicants submit that Claim 31 is patentably distinguishable from Okumura. Furthermore, Applicants submit that claims 32-33, which depend (directly or indirectly) from claim 31, are likewise patentably distinguishable for at least the same reason.

The Examiner has rejected Claims 25-33 under 35 U.S.C. § 102(b) as being anticipated by Japan Patent No. 6-291,202 (hereinafter “‘202 reference”). Applicants have amended claims 25 and 31 to more particularly point out the claimed invention. The ‘202 reference is directed to a semiconductor device that includes a lower boron and phosphorous doped SOG layer (15) and an upper non-doped SOG layer (16) located on an interlayer insulation film (14). However, the ‘202 reference does not disclose a passivation film that covers the surface of an interlayer insulating layer and wirings to protect the wirings from moisture. Furthermore, the film (16) does not contain boron in order to prevent a wiring layer located beneath the film from reacting with moisture in the atmosphere. As required in claims 25 and 31, the wirings of the present invention are located on the interlayer insulating film, and the passivation film is provided to cover the wirings and the interlayer insulating film. Accordingly, Applicants submit that independent claims 25 and 31 are patentably distinguishable from the ‘202 reference. Furthermore, Applicants submit that Claims 26-30 and 32-33, which depend (directly or indirectly) from claims 25 or 31, are likewise in condition for allowance for at least the same reasons.

Based upon the foregoing, Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In The Claims:

Claims 25, 28, and 31 have been amended as follows:

25. (Four Times Amended) A semiconductor device comprising:
- a semiconductor substrate;
 - an interlayer insulating film located on the semiconductor substrate;
 - wirings located on the interlayer insulating film; and
 - 5 a passivation film covering the surface of the interlayer insulating film and the wirings, including a first insulating film that is a modified spin-on-glass (SOG) film [formed by implanting] containing boron impurity implanted into an organic SOG film to form the modified SOG film.
28. (Twice Amended) The semiconductor device according to claim 25, wherein [organic components in] the first insulating film [have been] includes organic components decomposed by said boron impurity.

31. (Four Times Amended) A semiconductor device comprising:

a semiconductor substrate;

an interlayer insulating film located on the semiconductor substrate;

wirings located on the interlayer insulating film; and

5 a passivation film covering the surface of the interlayer insulating film and the wirings, including a first insulating film that is a modified spin-on-glass (SOG) film [formed by implanting] containing boron impurity implanted into an inorganic SOG film to form the modified SOG film.